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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/933,315	08/20/2001	Erik V. Johnson	14210BAUS02U	7049
34845	7590	02/11/2004	EXAMINER	
STEUBING AND MCGUINNESS & MANARAS LLP 125 NAGOG PARK ACTON, MA 01720			LAVARIAS, ARNEL C	
			ART UNIT	PAPER NUMBER
			2872	

DATE MAILED: 02/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/933,315

Applicant(s)

JOHNSON ET AL.

Examiner

Arnel C. Lavarias

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2003 and 15 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) 5-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. 10.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. In response to inquiry regarding the last Office action, the following corrective action is taken.

The period for reply of three (3) MONTHS set in said Office Action is restarted to begin with the mailing date of this letter.

2. A copy of the last Office Action, dated 6/25/03 but inadvertently mailed to the incorrect correspondence address, follows.

***Response to Amendment***

3. The amendments to the specification in Papers No. 6, dated 3/12/03, and 8, dated 4/15/03, are acknowledged and accepted. In view of these amendments, the objections to the specification in Section 3 of Paper No. 5, dated 12/12/02, are respectfully withdrawn.
4. The amendments to Claim 4 in Papers No. 6, dated 3/12/03, and 8, dated 4/15/03, are acknowledged and accepted. In view of these amendments, the objections to the claims in Section 4 of Paper No. 5, dated 12/12/02, are respectfully withdrawn.

***Response to Arguments***

5. The Applicants argue that the Brzozowski et al. reference was misapplied and improper under 35 U.S.C. 102(b). The Examiner agrees and respectfully withdraws the rejections to Claims 1-4 under 35 U.S.C. 102(b) (See Sections 9 and 11 in Paper No. 5, dated 12/12/02). The Examiner notes that the substance of the rejections is valid even

though the Brzozowski et al. reference was misapplied under the inappropriate statute.

Claims 1-4 are rejected over Brzozowski et al. as stated below.

6. The Applicants argue that Smith fails to teach or reasonably suggest one stable, non-absorbing optical hard limiter and that the Examiner has not given this limitation patentable weight. The Applicants further argue that the term 'optical hard limiter' is defined in the specification of the instant application and that the Examiner must rely on such to determine the meaning of the term 'optical hard limiter'. The Examiner respectfully disagrees. It is noted that the term 'optical hard limiter' is extremely well known in the art, and that the definition provided by Applicant's disclosure (Applicants have referred to Page 5, lines 5-25) is only one specific instance of the term 'optical hard limiter' used in conjunction with optical materials consisting of alternating layers of materials with different linear refractive indices and oppositely signed Kerr coefficients. The Examiner would like to point out that if such specific instance of the term 'optical hard limiter' is intended in the recitation of Claim 1, a positive recitation indicating such is needed, since the limitations of Claim 1 do not recite an optical hard limiter having the features as described in Page 5, lines 5-25. Also, as per MPEP 2111, the Examiner is required to give the claim its broadest reasonable interpretation. Hence, the term 'optical hard limiter' has been given its broadest interpretation within the scope of one having ordinary skill in the art. Additionally, the Examiner notes that Smith does not specifically disclose the term 'optical hard limiter' for the system disclosed in Figure 2 (See 15 in Figure 2 of Smith). However, such a system operates to limit the passage of input light (See either  $I_A$  or  $I_B$  in Figure 2 of Smith) light to the output (See 29 in Figure 2

of Smith) until a trigger light pulse is sent into the system (See  $I_{\text{Trig}}$  in Figure 2 of Smith). In the case of input IA, the IA light intensity is switched off, whereas, for the case of IB, the IB light intensity is switched on. Additionally, the system utilizes a material with a nonlinear refractive index (Kerr nonlinearity) (See 20 in Figure 2 and col. 3, line 5-col. 4, line 10) that operates on light in the same way that the materials in the instant application operate, i.e. refractive index of the material is highly dependent on the intensity of light propagating through the material. The changes in refractive index act to tune the ring cavity to resonance, and hence allows light propagating through the system to be switched on or off (i.e. optically limiting the passage of light through the system). Such a system does not rely on absorption effects, and hence is non-absorbing.

7. The Applicants argue that Smith fails to teach or reasonably suggest the transmitted characteristics of a stable, non-absorbing hard limiter including a third range bounded by input signals in the range above approximately  $I_2$  in which the transmitted output signal of the stable, non-absorbing optical hard limiter is approximately  $I_2$ , where  $I_1$  is approximately half of  $I_2$ ; and the reflected characteristics of a stable, non-absorbing hard limiter including a third range bounded by input signals in the range above approximately  $I_2$  in which the reflected output signal of the stable, non-absorbing optical hard limiter increases as the input signal increases above  $I_2$ , where  $I_1$  is approximately half of  $I_2$ . The Examiner agrees, and respectfully withdraws the rejections to Claims 3 and 4 in Section 10 of Paper No. 5, dated 12/12/02.
8. The Applicants argue that Smith in view of Cuykendall et al. fails to teach or reasonably suggest the at least one stable, non-absorbing optical hard limiter comprising

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alternating layers of materials with different linear refractive indices and oppositely signed Kerr coefficients. The Examiner respectfully disagrees. The nonlinear material of Smith (See 20 in Figure 2 of Smith) operates on the principle of Kerr nonlinearity in the refractive index. Similarly, the layered materials of Cuykendall et al. also operate on the principles of Kerr nonlinearity in the refractive index of the various materials in the layered structure (See Figures 1, 4, 16a, 16b). One skilled in the art would look to make the simple substitution of the medium of Smith with the layered medium of Cuykendall et al. to improve switching and transmitted beam shape, as stated in Section 12 of Paper No. 5, dated 12/12/02.

9. Claims 1-4 are rejected as follows.

#### ***Double Patenting***

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

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11. Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claim 1 of copending Application No. US2002/0109873 A1. See Section 6 of Paper No. 5, dated 12/12/02.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

12. Claims 1-4 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1, 3-6 of copending Application No. US2002/0195208 A1. Although the conflicting claims are not identical, they are not patentably distinct from each other because Claims 1, 3-6 of Application No. US2002/0195208 A1 similarly disclose logic devices based on stable, non-absorbing optical hard limiters (See Claim 1, 3, 6), wherein the limiter comprises alternating layers of materials with different linear indices and oppositely signed Kerr coefficients (See Claim 1, 3); and the transmitted characteristics and the reflected characteristics comprise the limitations as recited in Claims 3 and 4, respectively (See Claims 4 regarding the transmitted characteristics, Claim 5 regarding the reflected characteristics).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

***Claim Rejections - 35 USC § 102***

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 1-3 are rejected under 35 U.S.C. 102(a) as being anticipated by Brzozowski et al.

Brzozowski et al. discloses an optical logic device for processing information optically using the transmitted and/or reflected characteristics of at least one stable, non-absorbing optical hard limiter (See Page 3, Section II; Pages 6-7, Section III d; Figure 9), wherein the optical hard limiter comprises alternating layers of materials with different linear indices and oppositely signed Kerr coefficients (See Figure 1; Page 3, Section II). Brzozowski et al. additionally discloses the transmitted characteristics of the hard limiter comprising a first range, a second range, and a third range, the ranges being defined as recited in Claim 3 of the instant application (See Figures 6, 7; Page 3, Section II; Page 4-5, Section III a).

16. Claim 4 is rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Brzozowski et al.

Brzozowski et al. discloses the invention as set forth above in Claims 1-3.

Brzozowski et al. inherently discloses the optical logic device wherein the reflected



characteristics of the hard limiter comprise a first range, a second range, and a third range as recited in Claim 4 of the instant application (See Figures 6-7 for the transmitted characteristics of the hard limiter). Inherently, by the law of conservation of energy, the input intensity to the hard limiter must equal the sum of the energy absorbed, reflected, and transmitted by the hard limiter. Since the hard limiter is ideally a non-absorbing hard limiter, the input energy equals the sum of the output energy that is reflected and transmitted. Figure 6 of Brzozowski et al. discloses the transmitted energy as a function of the input energy. The reflected energy is therefore calculated as (input energy – transmitted energy), and this reflected energy is therefore plotted as a function of input energy as well, leading to the claimed characteristics as recited in Claim 4 of the instant application. In the case that Claim 4 is not clearly anticipated by Brzozowski et al., it would have been obvious to one skilled in the art at the time the invention was made to have the reflected characteristics of the hard limiter include the claimed characteristics as recited in Claim 4 of the instant application, since it has been held that discovering an optimum value of a result effective variable involved only routine skill in the art. One would have been motivated to have the reflected characteristics of the hard limiter include the claimed characteristics as recited in Claim 4 of the instant application for the purpose of adjusting the dynamic range of the hard limiter based on the refractive indices of the two materials used in the hard limiter.

17. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Smith.

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Smith discloses an optical logic device for processing information optically using the transmitted and/or reflected characteristics of at least one stable, non-absorbing optical hard limiter (See Figures 1-5; col. 2, line 46-col. 5, line 24).

18. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith in view of Cuykendall et al.

See Section 12 of Paper No. 5, dated 12/12/02.

19. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Salehi et al. (J. A. Salehi, C. A. Brackett, "Code division multiple-access techniques in optical fiber networks- Part II: Systems performance analysis", IEEE Trans. Communications, vol. 37, no. 8, 8/1989, pp. 834-842.) in view of Kahn (L. M. Kahn, "Optical power limiting in multilayer systems with nonlinear response", Phys. Rev. B, vol. 53, no. 3, 1/15/1996, pp. 1429-1437.).

Salehi et al. discloses an optical logic device for processing information optically using the transmitted and/or reflected characteristics of at least one stable, optical hard limiter (See Section V; Figure 5). Salehi et al. lacks the optical hard limiter being non-absorbing and comprising alternating layers of materials with different linear indices and oppositely signed Kerr coefficients. However, Kahn teaches a particular type of optical hard limiter that utilizes a periodic lattice of layers having alternating linear and nonlinear refractive indices for power limiting (See Figure 1; Sections I-III). The power limiting occurs through Kerr nonlinearity, as opposed to absorption (See Sections I and V), wherein the transmission of light through the material is dependent on the light intensity (See Page 1429, col. 2-Page 1430, col. 1; Equation 2.1) and that the positive (or zero) and

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negative coefficients show up in the coefficient 'g' (See Sections II and III; Figure 1).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the optical hard limiter be non-absorbing and comprise alternating layers of materials with different linear indices and oppositely signed Kerr coefficients, as taught by Kahn, in the device of Salehi et al., for the purpose of reducing the effects of defects and light absorption on the optical limiting process, as well as provide a passive means of optically limiting light without the use of additional electrical input.

### *Conclusion*

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arnel C. Lavarias whose telephone number is 571-272-2315. The examiner can normally be reached on M-F 8:30 AM - 5 PM EST.

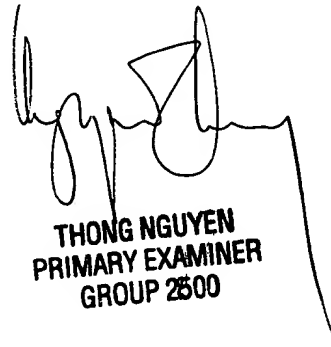
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Arnel C. Lavarias  
2/2/04



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